

CLAIMS

1. A single-crystal layer of a first semiconductor material (5) comprising single-crystal nanostructures of a second semiconductor material (3), wherein the nanostructures are distributed according to a regular centered tetragonal mesh crystal lattice.

2. The layer of claim 1, wherein the first semiconductor material (5) is silicon and the second semiconductor material (3) is germanium.

3. The layer of claim 2, wherein the height (b) of the tetragonal mesh is equal to the sum of two equal elementary values (e_{Sj}) selected from a range of from 60 to 80% of the nanostructure diameter (D) up to four times the diameter.

4. The layer of claim 2, wherein the planar base of the centered tetragonal mesh is substantially square and exhibits a side of a value (a) ranging between 50 and 300 nm.

5. A light source, comprising the layer of claim 1 associated with an electric excitation circuit.

6. The source of claim 5, forming a coherent source.

7. The source of claim 5, forming a diode.

8. A light-trapping device, comprising the layer of claim 1.

9. A photodetector, comprising the device of claim 8.

10. A diffractor of a light or acoustic wave, comprising the layer of claim 1.

11. An optical or acoustic filter, comprising the layer of claim 1.